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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/063,285	04/08/2002	Jeffrey Scott Hepburn	201-1010 AJL	2450

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EXAMINER

TRAN, BINH Q

ART UNIT	PAPER NUMBER
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3748

DATE MAILED: 04/24/2003

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Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

10/063,285

Applicant(s)

HEPBURN ET AL.

Examiner

BINH Q. TRAN

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-31 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-11 and 13-31 is/are rejected.
- 7) ☒ Claim(s) 12 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

**Priority under 35 U.S.C. §§ 119 and 120**

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 2.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_.

## DETAILED ACTION

### *Claim Objections*

Claims 9 and 31 are objected to because of the following informalities:

-In claim 9, line 1, "***claim 10*** " should be changed to ***-claim 1--***.

-In claim 31, line 1, "***predetermined pore size is greater than about*** " is unclear.

Appropriate correction is required.

### *Claim Rejections - 35 USC § 103*

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

***Claims 1, 6-9, and 14-29 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hayashi et al. (Hayashi) (Patent Number 4,934,142) in view of design choice.***

Regarding claims 1, 6-8, and 14-25, Hayashi discloses an exhaust aftertreatment system for a reciprocating internal combustion engine having at least one cylinder and a catalytic converter disposed in an exhaust duct of the engine which receives an exhaust gas stream from the engine, comprising a trap (e.g. 15, 16) disposed in the exhaust duct located upstream of the catalytic converter (15) (See Fig. 3), said trap is comprised of a porous ceramic or metallic material having a predetermined average pore size, said trap substantially fills the cross-section of the

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exhaust duct, wherein exhaust gases undergo multiple, random turns in traveling from an upstream side to a downstream side of said trap (See col. 3, lines 49-67; col. 4, lines 1-44). However, Hayashi fails to disclose a volume of the trap is less than 10% of a swept volume of the engine's cylinders coupled to said trap, and a pressure difference between an upstream side and a downstream side of the phosphorus trap is less than 1 kilopascal.

Regarding the specific range of the volume, and pressure difference between an upstream side and a downstream side of the phosphorus trap, it is the examiner's position that a range less than 10% of a swept volume of the engine's cylinders, and the volume is less than 1 kilopascal, would have been an obvious matter of design choice well within the level of ordinary skill in the art, depending on variables such as size of the engine, as well as mass flow rate of the exhaust gas, engine operating conditions, and properties of materials for making the trap and catalyst. Moreover, there is nothing in the record which establishes that the claimed parameters present a novel or unexpected result (See *In re Kuhle*, 562 F. 2d 553, 188 USPQ 7 (CCPA 1975)).

Under some circumstances, however, changes such as these may impart patentability to a process if the particular ranges claimed produce a new and unexpected result which is different in kind and not merely in degree from the results of the prior art. *In re Dreyfus*, 22 CCPA (Patents) 830, 73 F.2d 931, 24 USPQ 52; *In re Waite et al.*, 35 CCPA (Patents) 1117, 168 F.2d 104, 77 USPQ 586. Such ranges are termed "critical" ranges, and the applicant has the burden of proving such criticality. *In re Swenson et al.*, 30 CCPA (Patents) 809, 132 F.2d 1020, 56 USPQ 372; *In re Scherl*, 33 CCPA (Patents) 1193, 156 F.2d 72, 70 USPQ 204. However, even though applicant's modification results in great improvement and utility over the prior art, it may still not be patentable if the modification was within the capabilities of one skilled in the art. *In re Sola*, 22 CCPA

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(Patents) 1313, 77 F.2d 627, 25 USPQ 433; In re Normann et al., 32 CCPA (Patents) 1248, 150 F.2d 627, 66 USPQ 308; In re Irmischer, 32 CCPA (Patents) 1259, 150 F.2d 705, 66 USPQ 314. More particularly, where the general conditions of a claim are disclosed in the prior art, it is not inventive to discover the optimum or workable ranges by routine experimentation. In re Swain et al., 33 CCPA (Patents) 1250, 156 F.2d 239, 70 USPQ 412; Minnesota Mining and Mfg. Co. v. Coe, 69 App. D.C. 217, 99 F.2d 986, 38 USPQ 213; Allen et al. v. Coe, 77 App. D.C. 324, 135 F.2d 11, 57 USPQ 136.

Regarding claim 9, Hayashi further discloses that the trap is treated with a washcoat capable of catalyzing oxidation reactions of carbon monoxide and hydrocarbons in said exhaust gases (See col. 3, lines 49-67; col. 4, lines 1-44).

*Claims 2-5, 10-11, 13, and 31 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hayashi in view of Tsuru et al. (Tsuru) (Patent Number 5,310,548).*

Regarding claims 2-4, 10, and 31, Hayashi discloses all the claimed limitation as discussed above except that the average pore size of the trap is greater than about 80 micrometers, and the trap is capable of collecting more than 90% of particles greater than 50 micrometers in diameter.

Tsuru teaches that it is conventional in the art, to use the phosphorous trap having an average pore size of the trap is greater than about 80 micrometers, and the trap is capable of collecting more than 90% of particles greater than 50 micrometers in diameter (See col. 4, lines 15-61; col. 23, lines 40-67; Claims 17-18).

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It would have been obvious to one having ordinary skill in the art at the time the invention was made, to use the phosphorous trap having an average pore size of the trap is greater than about 80 micrometers, and the trap is capable of collecting more than 90% of particles greater than 50 micrometers in diameter of Hayashi, as taught by Tsuru for the purpose of removing odor from the exhaust gas of an internal combustion engine, so as to reduce the poisoned materials in the purifying catalyst, and further improve the performance of the engine and the efficiency of the emission device.

Regarding claim 5, Tsuru further discloses that the porous material is foam (See col. 9, lines 1-18).

Regarding claim 11, Hayashi further discloses that the an exhaust gas component sensor disposed in said exhaust duct (47, 48), said exhaust gas component sensor is located downstream of said trap to protect said sensor.

Regarding claim 13, Hayashi further discloses that the trap is treated with a washcoat capable of catalyzing oxidation reactions of carbon monoxide and hydrocarbons in said exhaust gases (See col. 3, lines 49-67; col. 4, lines 1-44).

Regarding claims 26-29, Hayashi further discloses that the indication is based on a time of engine operation since temperature in said phosphorus trap last exceeded said predetermined temperature, wherein the predetermined temperature is greater than 225 degrees Celsius ( See col. 3, lines 49-67; col. 4, lines 1-10).

Regarding claim 30, Hayashi further discloses that the speed of the engine is increased to cause said rise in temperature in said phosphorus trap (See col. 5, lines 14-48).

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*Allowable Subject Matter*

Claims 12 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Since allowable subject matter has been indicated, applicant is encouraged to submit formal drawings in response to this Office action. The early submission of formal drawings will permit the Office to review the drawings for acceptability and to resolve any informalities remaining therein before the application is passed to issue. This will avoid possible delays in the issue process.

*Prior Art*

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure and consists of five patents:

Tsuru et al. (Patent Number 5,545,240), Peter-Hoblyn et al. (Patent Number 6,003,303), Christen et al. (Patent Number 6,405,528), Itoh et al. (Patent Number 6,361,579), and Blanchet (Patent Number 5,857,326) all discloses an exhaust gas purification for use with an internal combustion engine.

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*Conclusion*

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Examiner Binh Tran whose telephone number is (703) 305-0245. The examiner can normally be reached on Monday-Friday from 8:30 a.m. to 5:00 p.m.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Thomas E. Denion, can be reach on (703) 308-2623. The fax phone number for this group is (703) 746-4561.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Group receptionist whose telephone number is (703) 308-0861.

A handwritten signature in black ink, appearing to read 'Binh Tran', with a long, sweeping horizontal stroke extending to the right.

BT  
April 19, 2003

Binh Tran  
Patent Examiner  
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